OPTIBAR P 1010/2010 Supplementary Instructions

Pressure transmitter

Category
ATEX: II 1G Ex ia IIC T4 Ga
II 1D Ex ia IIIC T85 °C Da

IECEx: Ex ia IIC T4 Ga
Ex ia IIIC T85 °C Da

KROHNE

1.1 General notes

This additional Ex instruction applies to explosion-protected versions of the pressure transmitter OPTIBAR P 1010 / P 2010 with the marking II 1 G or II 1 D. It completes the standard documentation for non-explosion protected versions.

The information given in this instruction contains only the data relevant to explosion protection of category 1. The technical details given in the manual for the non explosion-protected versions remain unchanged unless excluded or superseded by this document.

1.2 EU conformity

The manufacturer declares with the EU declaration of conformity on his own responsibility conformity with the protection goals of directive 2014/34/EU according to EN 60079-0, EN 60079-11 and EN 60079-26 for use in hazardous areas with gas.

The EU declaration of conformity is based on the EU type examination certificate of the Institut für Sicherheitstechnik GmbH:

IBExU 13 ATEX 1133 X

The "X" after the certificate number refers to special conditions for safe use of the device, which have been listed in these instructions.
If needed the EU type examination certificate can be downloaded from the manufacturer's website.

1.3 Approval according to the IECEx scheme

Conformity with IECEx standards was tested in accordance with the "IECEx Certification Scheme for Explosive Atmospheres" according to IEC 60079-0, IEC 60079-11 and IEC 60079-26. The number of the IEC certificate is:

IECEx IBE 13.0050 X

The "X" after the certificate number refers to special conditions for safe use of the device, which have been listed in these instructions.
If needed the IEC certificate can be downloaded from the manufacturer's website.

1.4 Safety instructions

Assembly, installation, start-up and maintenance may only be performed by **personnel trained in explosion protection**!

CAUTION!
The operator or his agent is responsible for observing any additional standards, directives or laws if required due to operating conditions or place of installation.
This applies in particular to the use of easily detachable process connections when measuring flammable media.

2.1 Description of device

The OPTIBAR P 1010 / P 2010 pressure transmitters are designed to measure the absolute pressure and gauge pressure in flammable and non-flammable gases and liquids. The pressure transmitters are supplied as standard with 2-wire, 4...20 mA signal outputs.

2.2 Marking

The marking of the entire device is on the housing, where the following identification plate can be found.

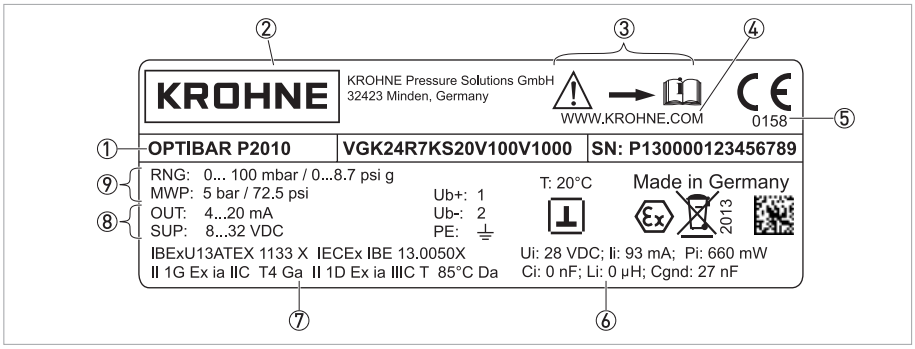

Figure 2-1: Example of an identification plate

① Device type
② Manufacturer
③ Note to observe the documentation
④ Manufacturer's website
⑤ ID number for the CE marking
⑥ Approvals-related connection data
⑦ Information relevant for Ex approval
⑧ Electrical connection data
⑨ Rating data: measuring range, MWP

2.3 Flammable products

Atmospheric conditions:
An explosive atmosphere is a mixture of air and flammable gases, vapours, mists or dusts under atmospheric conditions. It is defined by the following values
T_{atm} = -20...+60°C / -4...+140°F and P_{atm} = 0.8...1.1 bar / 11.6...15.9 psi.
Outside of this range, for most mixtures no key figures are available for the ignition behaviour.

Operating conditions:
Outside of atmospheric conditions, the explosion protection according to directive 2014/34/EU (ATEX) – regardless of the zone assignment – is not applicable due to the lack of key safety data.

2.4 Equipment category

Pressure transmitters are rated in the Categories II 1G or EPL Ga for use in zone 0 and II 1D or Da for use in zone 20.

2.5 Types of protection

The pressure transmitter is designed with protection type intrinsic safety, protection level "ia" according to EN 60079-11.

The marking according to ATEX is:
II 1G Ex ia IIC T4 Ga
II 1D Ex ia IIIC T85 °C Da

The marking according to IECEx is:
Ex ia IIC T4 Ga
Ex ia IIIC T85 °C Da

The marking contains the following information:	
II	Explosion protection, group II
1	Equipment category 1
G	Gas explosion protection
D	Dust ignition protection
Ex ia	Intrinsically safe, level of protection "ia"
IIC	Gas group, suitable for gas groups IIC, IIB and IIA
IIIC	Dust group, suitable for dust groups IIIA, IIIB and IIIC
T4	Temperature class, suitable for temperature classes T4...T1
T85°C	Maximum surface temperature 85°C / 185°F
Ga	EPL, suitable for zone 0
Da	EPL, suitable for zone 20

Table 2-1: Types of protection

2.6 Ambient temperature / temperature classes

Use in **zone 0 / zone 20**, ambient temperature range: -20...+60°C / -4...+140°F
(P_{atm}: 0,8...1,1 bar / 11,6...15,9 psi)

Use in **zone 1 / zone 21**, ambient temperature range: -20...+70°C / -4...+158°F

2.7 Electrical data

Signal output: 4...20 mA, 2-wire
Nominal voltage: 10...28 VDC
Nominal current: 4...20 mA

Built-in equipment for the pressure transmitters may only be connected to separate intrinsically safe circuits with the following maximum values:

- U_i: 28 V
- I_i: 93 mA
- P_i: 660 mW
- C_i: ~ 0 nF
- L_i: ~ 0 µH

The supply connections have a maximum internal capacity of 27 nF to the housing plus circuit inductivities 1 µH/m and circuit capacities 160 pF/m (for factory cable).

3.1 Mounting

CAUTION!
The manufacturer is not liable for any damage resulting from improper use or use other than the intended purpose. This applies in particular to hazards due to insufficient corrosion resistance and suitability of the materials in contact with product.

Installation and setup must be carried out according to the applicable installation standards (e.g. EN 60079-14 or IEC 60079-14) by qualified personnel trained in explosion protection. The information given in the manuals and the supplementary instructions must be observed at all times.

Install pressure transmitters so that:

- they are not in a pneumatic flow.
- excessive dust deposits (over 5 mm) and complete dust coverage are prevented.
- there is no danger from mechanical impact effects.

4.1 General notes

Overvoltage protection

If the pressure transducer is being used as category 1 G equipment, a suitable overvoltage protection device must be installed upstream (see Industrial Safety Regulations [BetrSichV] formerly Technical Regulations for Flammable Liquids [TRbF100] and EN 60079-14).

Circuits

The circuits are designed in protection type "intrinsically safe".

The connecting cables should be selected according to the applicable installation standards (e.g. EN 60079-14) and the maximum operating temperature. Ensure that no residual current can form between separate intrinsically safe signal circuits.

- The connecting cables must be fixed and laid so they are sufficiently protected against damage.
- Devices with plugs are to be mounted in that way that protection degree IP20 is maintained.
- All cores that are not used must be securely connected to the ground potential of the hazardous area or carefully insulated against each other and against ground (test voltage ≥ 500 V_{eff}).
- Lay cables so as to ensure that there is sufficient distance between surfaces of the measuring unit and the connecting cable.
- Supplied blind plugs / cable entries guarantee protection against foreign bodies and water (protection category) IP66 / 67 according to EN 60529 in the temperature range T_{amb} = -40...+100°C / -40...+212°F.
- The outer diameter of the connecting cable must be within the sealing range of the cable entry (8...13 mm / 0.31...0.51").
- Unused cable entries are to be closed (>IP66 / 67).

Ensure that all seals are tight.

4.2 Power supply

The pressure transmitter does not require a separate power supply. The required supply for the built-in electronics is provided via the 4...20 mA current output.

Overvoltage protection

If the level probe is being used as category 1 G equipment, a suitable overvoltage protection device must be installed upstream (see Industrial Safety Regulations [BetrSichV] and EN 60079-14).

4.3 Inputs/outputs

The terminal assignment of the built-in electrical equipment is described in the standard documentation. The pressure transmitter signal circuits may only be connected to certified intrinsically safe slave units or circuits. For more information refer to chapter "Electrical data".

4.4 Grounding and equipotential bonding

If the device is not sufficiently electrostatically grounded via the process cables, an additional ground connection must be established using the ground terminal.

Any existing cable shields should be connected to ground according to applicable installation regulations (EN 60079-14). A terminal connection in the terminal compartment permits a short way grounding of the cable shields.

5.1 Start-up

Start-up is only permitted when the pressure transmitter:

- is correctly installed in the system and connected.
- has been checked for the proper state with regard to its installation and connection requirements.

The user of the system must have it checked before start-up in compliance with the national regulations for checks before startup.

5.2 Operation

Pressure transmitter must be operated in such a way that they remain within the maximum and minimum permissible temperatures and pressures and the electrical limit values.

Pressure transmitter may only be operated if the equipment parts necessary for safety are effective in the long run, and are not rendered inoperable during operation.

For more information refer to chapter "Dismantling".

5.3 Electrostatic charge

A caution label points out the safety measures that must be taken with regard to electrostatic charges during operation.

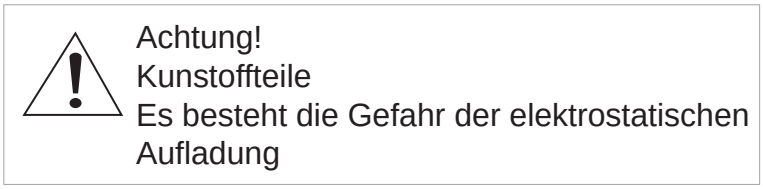

Figure 5-1: Warning sign

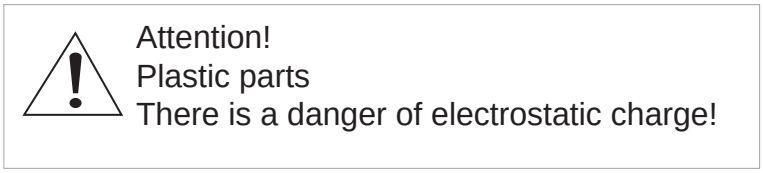

Figure 5-2: Warning note

In order to avoid ignition hazards due to electrostatic charge, the pressure transmitter may not be used in areas with:

- processes that generate strong charges,
- mechanical friction and cutting processes,
- spraying of electrons (e.g. in the vicinity of electrostatic painting systems).

In order to avoid ignition hazards due to electrostatic charge, the connecting cables must be permanently laid and the pressure transmitter may not be dry cleaned.

6.1 Maintenance

Maintenance work of a safety-relevant nature within the meaning of explosion protection may only be carried out by the manufacturer, his authorised representative or under the supervision of authorised inspectors.

To maintain proper condition, regular inspections are required for systems in hazardous areas.

The following checks are recommended:

- Checking the housing, the cable entries and the feed lines for corrosion and/or damage.
- Checking the measuring unit and the piping connections for leakage.
- Checking the measuring unit and the indicator for dust deposits.
- Including the pressure transmitters in the regular pressure test of the process line.

6.2 Dismantling

Removal and installation are the responsibility of the operator.

Before disconnecting the electric connecting cable of the device, make sure that all cables leading to the indication unit are isolated from the ground of the hazardous area. This also applies to functional earthing conductors (FE) and equipotential bonding conductors (PA).

WARNING!

- *Pressurised pipes have to be depressurised before removing the measuring unit.*
- *In the case of environmentally critical or hazardous products, appropriate safety precautions must be taken with regard to residual liquids in the measuring unit.*
- *New gaskets have to be used when re-installing the device in the piping.*

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Head Office KROHNE Messtechnik GmbH
Ludwig-Krohne-Str. 5
47058 Duisburg (Germany)
Tel.: +49 203 301 0
Fax: +49 203 301 10389
info@krohne.com

The current list of all KROHNE contacts and addresses can be found at:
www.krohne.com

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